

From: [Taryn Mancine](#)
To: [DeBoer, Jenny](#)
Subject: RE: INVOICE - 213402493 Evergreen Marcus Hook (17515)
Date: Friday, January 08, 2016 1:27:44 PM
Attachments: [ATT00002.png](#)

Hi Jenny

Sorry this took so long, he thought he sent the email to you, but he did not. Please see his email response for data:

If this is a refinery site or bulk storage site, MW-409 is most likely an alkylate blending stream for gasoline manufacture. It could also be an aviation gasoline, but if so, it would contain TEL.

MW-468 appears to be a mix of heavily degraded gasoline and kerosene. The military specification fuel JP-4 is also a gasoline/kerosene mix. Alkyl lead analysis may be able to distinguish these: JP-4 would not contain lead; an old gasoline might.

As for the invoice, yes, that should not have been charged. If you would like I can analyze the organic lead no charge since that cost is \$300. Or I can have it credited - the only issue is now with the new year and different fiscal calendar, so might be a bigger mess. I could take the costs off from the newest samples we have in house for you, so that you not charged for that fee.

Let me know what is best and easiest on your end! Thanks!!

Taryn Mancine
Project Manager



220 William Pitt Way
Pittsburgh, PA 15238
Phone: 412-826-4481

taryn.mancine@pacelabs.com

GO STEELERS!

>>> "DeBoer, Jenny" <Jenny.DeBoer@stantec.com> 1/7/2016 12:18 PM >>>

Hi Taryn-

I just wanted to follow up on this invoice and the product types. I haven't seen anything from Dr. Jeffrey. Do you know when I should expect that?

Thanks, Jenny

From: DeBoer, Jenny
Sent: Monday, January 04, 2016 9:32 AM
To: 'Taryn Mancine'
Subject: RE: INVOICE - 213402493 Evergreen Marcus Hook (17515)

Hi Taryn-

Once I get the product type information from Dr. Jeffrey, I'll get this invoice processed. I received another invoice from Ruth Welsh (attached) that included a fee for data interpretation and

report preparation. Can you tell me what this is for as I didn't request a report?

Thanks, Jenny

From: Taryn Mancine [mailto:Taryn.Mancine@pacelabs.com]
Sent: Monday, December 21, 2015 10:33 AM
To: DeBoer, Jenny
Subject: INVOICE - 213402493 Evergreen Marcus Hook (17515)

Thanks and Merry Christmas :)

Taryn Mancine
Project Manager



220 William Pitt Way
Pittsburgh, PA 15238
Phone: 412-826-4481

taryn.mancine@pacelabs.com

This email has been scanned by the Symantec Email Security.cloud service.
For more information please visit <http://www.symanteccloud.com>

December 18, 2015



Jenny DeBoer
Stantec
1060 Andrew Drive; Suite 140
West Chester, PA 19380

RE: Evergreen, Marcus Hook AOI 4, 5
Project Number: 213402493

Pace Analytical received 2 sample(s) received on December 2nd, 2015 for analysis labeled MW-409 and MW-468. Per client request, the following analyses were performed:

1. C3-C36 Whole Oil (ASTM 3328)
2. Specific Gravity (ASTM D1217)

The sample was performed in house under laboratory number **17515**.

Please call the lab at 412-826-4481, or you may email any questions or concerns to taryn.mancine@pacelabs.com regarding any analytical data reports.

Respectfully submitted,

Taryn Mancine

Taryn Mancine
Project Manager/Scientist



CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Section A

Required Client Information:

Company:	Stanlec Consulting Services, Inc
Address:	1060 Andrew Drive, Suite 140 West Chester, PA 19380
Email To:	Jenny.DeBoer@stanlec.com
Phone:	610-250-2500 Fax: 610-840-2501
Requested Due Date/TAT:	Standard

Section B

Required Project Information:

Report To:	Jenny.DeBoer@stanlec.com
Copy To:	
Purchase Order No.:	
Project Name:	Evergreen, Marcus Hook AOI 4, 5
Project Number:	213402493

Section C

Invoice Information:

Attention:	
Company Name:	
Address:	
Page Quote	
Reference:	
Page Project	
Page Profile #:	

Page: 1 of 1

REGULATORY AGENCY

<input type="checkbox"/> NPDES	<input type="checkbox"/> GROUND WATER	<input type="checkbox"/> DRINKING WATER
<input type="checkbox"/> UST	<input type="checkbox"/> RCRA	<input type="checkbox"/> OTHER

Site Location
STATE: PA

Requested Analysis Filtered (Y/N)

Preservatives

Unpreserved	
H ₂ SO ₄	
HNO ₃	
HCl	
NaOH	
Na ₂ S ₂ O ₃	
Methanol	
Other	

Analysis Test
C3-C36 (ASTM D3328)
Specific Gravity

Residual Chlorine (Y/N)

Pace Project No./ Lab I.D.

1	MMW-409	P	G	11/24/15	14:40																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
---	---------	---	---	----------	-------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

ADDITIONAL COMMENTS

Please report product identification (and relative proportions), degree of weathering, age information and any other interpretive information available from the requested analyses. Questions can be directed to Jenny DeBoer (cell 610-209-2511). Hold additional volume for possible additional analyses.

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
Jenny DeBoer	11/30/15	11:15	Jenny DeBoer	11/30/15	11:30	
	11/30/15	13:30		12-15	2:20	
				12-15	12:20	
				12-15	12:20	

SAMPLER NAME AND SIGNATURE			
PRINT Name of SAMPLER: Jenny DeBoer	DATE Signed (MM/DD/YY): 11/30/2015		
SIGNATURE of SAMPLER:			
Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

Cooler Receipt Form

Client Name: Stantec Project: Evergreen Lab Work Order: 17575

A. Shipping/Container Information (circle appropriate response)

Courier: FedEx UPS USPS Client Other: Pace-O Air bill Present: Yes No

Tracking Number: _____

Custody Seal on Cooler/Box Present: Yes No Seals Intact: Yes No

Cooler/Box Packing Material: Bubble Wrap Absorbent Foam Other: _____

Type of Ice: Wet Blue None Ice Intact: Yes Melted

Cooler Temperature: 50C Radiation Screened: Yes No Chain of Custody Present: Yes No

Comments: _____

B. Laboratory Assignment/Log-in (check appropriate response)

	YES	NO	N/A	Comment Reference non-conformance
Chain of Custody properly filled out	<input checked="" type="checkbox"/>			
Chain of Custody relinquished	<input checked="" type="checkbox"/>			
Sampler Name & Signature on COC	<input checked="" type="checkbox"/>			
Containers intact	<input checked="" type="checkbox"/>			
Were samples in separate bags	<input checked="" type="checkbox"/>			
Sample container labels match COC Sample name/date and time collected	<input checked="" type="checkbox"/>			
Sufficient volume provided	<input checked="" type="checkbox"/>			
PAES containers used			<input checked="" type="checkbox"/>	
Are containers properly preserved for the requested testing? (as labeled)			<input checked="" type="checkbox"/>	
If an unknown preservation state, were containers checked? Exception: VOA's coliform			<input checked="" type="checkbox"/>	If yes, see pH form.
Was volume for dissolved testing field filtered, as noted on the COC? Was volume received in a preserved container?			<input checked="" type="checkbox"/>	

Comments: _____

Cooler contents examined/received by: LG Date: 12-2-15

Project Manager Review: TM Date: 12-18-15

12/9/2015

ZymaX ID	17515-1
Sample ID	MW-409

Evaporation

n-Pentane / n-Heptane	2.55
2-Methylpentane / 2-Methylheptane	8.03

Waterwashing

Benzene / Cyclohexane	0.00
Toluene / Methylcyclohexane	294.88
Aromatics / Total Paraffins (n+iso+cyc)	0.10
Aromatics / Naphthenes	39.87

Biodegradation

(C4 - C8 Para + Isopara) / C4 - C8 Olefins	1992.32
3-Methylhexane / n-Heptane	16.61
Methylcyclohexane / n-Heptane	0.93
Isoparaffins + Naphthenes / Paraffins	68.31

Octane rating

2,2,4,-Trimethylpentane / Methylcyclohexane	1469.31
---	---------

Relative percentages - Bulk hydrocarbon composition as PIANO

% Paraffinic	1.30
% Isoparaffinic	88.37
% Aromatic	9.00
% Naphthenic	0.23
% Olefinic	1.10

12/9/2015

ZymaX ID
Sample ID

17515-1
MW-409

		Relative Area %
1	Propane	0.00
2	Isobutane	0.00
3	Isobutene	0.00
4	Butane/Methanol	0.13
5	trans-2-Butene	0.00
6	cis-2-Butene	0.00
7	3-Methyl-1-butene	0.00
8	Isopentane	2.24
9	1-Pentene	0.00
10	2-Methyl-1-butene	0.00
11	Pentane	0.06
12	trans-2-Pentene	0.01
13	cis-2-Pentene/t-Butanol	0.00
14	2-Methyl-2-butene	0.03
15	2,2-Dimethylbutane	0.01
16	Cyclopentane	0.00
17	2,3-Dimethylbutane/MTBE	2.36
18	2-Methylpentane	0.68
19	3-Methylpentane	0.34
20	Hexane	0.02
21	trans-2-Hexene	0.00
22	3-Methylcyclopentene	0.00
23	3-Methyl-2-pentene	0.00
24	cis-2-Hexene	0.00
25	3-Methyl-trans-2-pentene	0.00
26	Methylcyclopentane	0.02
27	2,4-Dimethylpentane	7.72
28	Benzene	0.00
29	5-Methyl-1-hexene	0.00
30	Cyclohexane	0.01
31	2-Methylhexane/TAME	0.34
32	2,3-Dimethylpentane	15.93
33	3-Methylhexane	0.37
34A	1-trans-3-Dimethylcyclopentane	0.00
34B	1-cis-3-Dimethylcyclopentane	0.00
35	2,2,4-Trimethylpentane	30.46
I.S. #1	à,à,à-Trifluorotoluene	0.00

12/9/2015

ZymaX ID	17515-1	
Sample ID	MW-409	
	Relative	
	Area %	
36	n-Heptane	0.02
37	Methylcyclohexane	0.02
38	2,5-Dimethylhexane	2.59
39	2,4-Dimethylhexane	3.84
40	2,3,4-Trimethylpentane	9.94
41	Toluene/2,3,3-Trimethylpentane	6.11
42	2,3-Dimethylhexane	2.58
43	2-Methylheptane	0.08
44	4-Methylheptane	0.03
45	3,4-Dimethylhexane	0.44
46A	3-Ethyl-3-methylpentane	0.00
46B	1,4-Dimethylcyclohexane	0.07
47	3-Methylheptane	3.17
48	2,2,5-Trimethylhexane	0.00
49	n-Octane	0.01
50	2,2-Dimethylheptane	0.51
51	2,4-Dimethylheptane	0.12
52	Ethylcyclohexane	0.10
53	2,6-Dimethylheptane	0.23
54	Ethylbenzene	0.05
55	m+p Xylenes	0.19
56	4-Methyloctane	0.01
57	2-Methyloctane	0.01
58	3-Ethylheptane	0.00
59	3-Methyloctane	0.01
60	o-Xylene	0.02
61	1-Nonene	1.06
62	n-Nonane	1.01
I.S.#2	p-Bromofluorobenzene	0.00
63	Isopropylbenzene	0.18
64	3,3,5-Trimethylheptane	0.63
65	2,4,5-Trimethylheptane	0.32
66	n-Propylbenzene	0.04
67	1-Methyl-3-ethylbenzene	0.00
68	1-Methyl-4-ethylbenzene	0.02
69	1,3,5-Trimethylbenzene	0.13
70	3,3,4-Trimethylheptane	2.82

12/9/2015

ZymaX ID
Sample ID

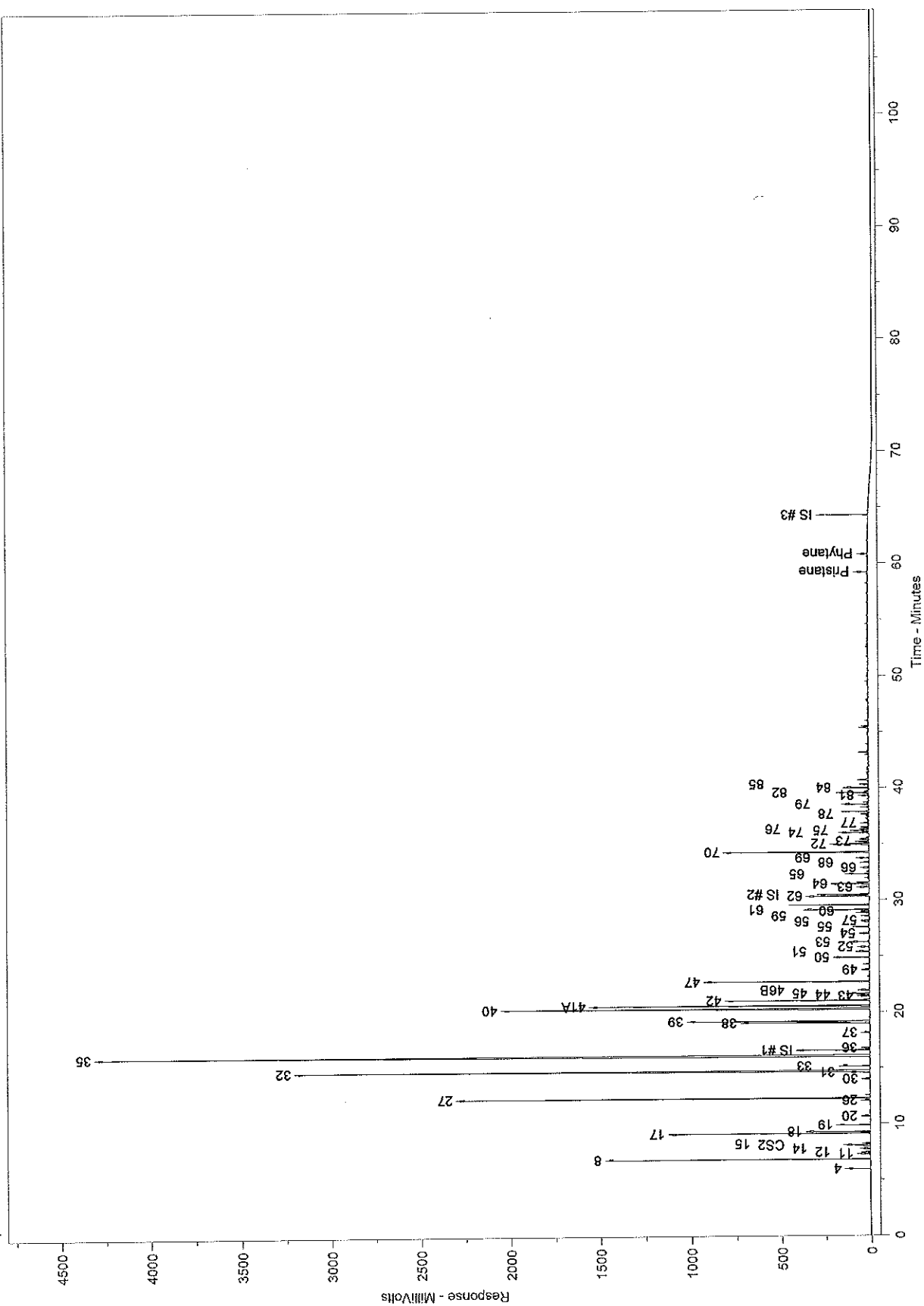
17515-1
MW-409

		Relative Area %
71	1-Methyl-2-ethylbenzene	0.00
72	3-Methylnonane	0.58
73	1,2,4-Trimethylbenzene	0.14
74	Isobutylbenzene	0.46
75	sec-Butylbenzene	0.26
76	n-Decane	0.04
77	1,2,3-Trimethylbenzene	0.03
78	Indan	0.02
79	1,3-Diethylbenzene	0.37
80	1,4-Diethylbenzene	0.00
81	n-Butylbenzene	0.07
82	1,3-Dimethyl-5-ethylbenzene	0.53
83	1,4-Dimethyl-2-ethylbenzene	0.00
84	1,3-Dimethyl-4-ethylbenzene	0.33
85	1,2-Dimethyl-4-ethylbenzene	0.04
86	Undecene	0.00
87	1,2,4,5-Tetramethylbenzene	0.00
88	1,2,3,5-Tetramethylbenzene	0.00
89	1,2,3,4-Tetramethylbenzene	0.00
90	Naphthalene	0.00
91	2-Methyl-naphthalene	0.00
92	1-Methyl-naphthalene	0.00

Chrom Perfect Chromatogram Report

17515-1 [MW-409] [400+600CS2] + IS F-022715-1

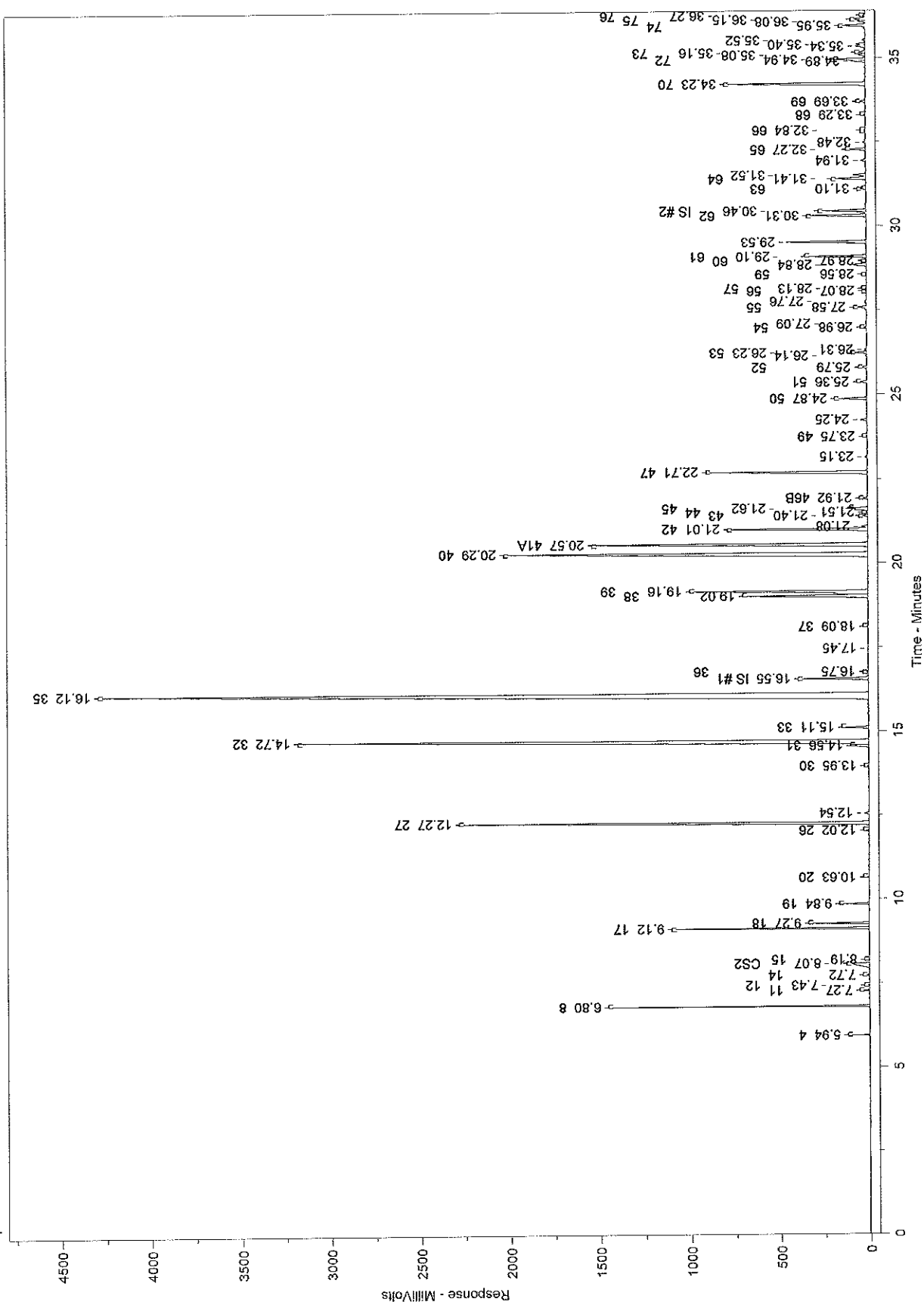
C:\CPSPrint\2015\Dec\15\120915\120915.0014.RAW



Chrom Perfect Chromatogram Report

17515-1 [MW-40g] [400+600CS2] + IS F-022715-1

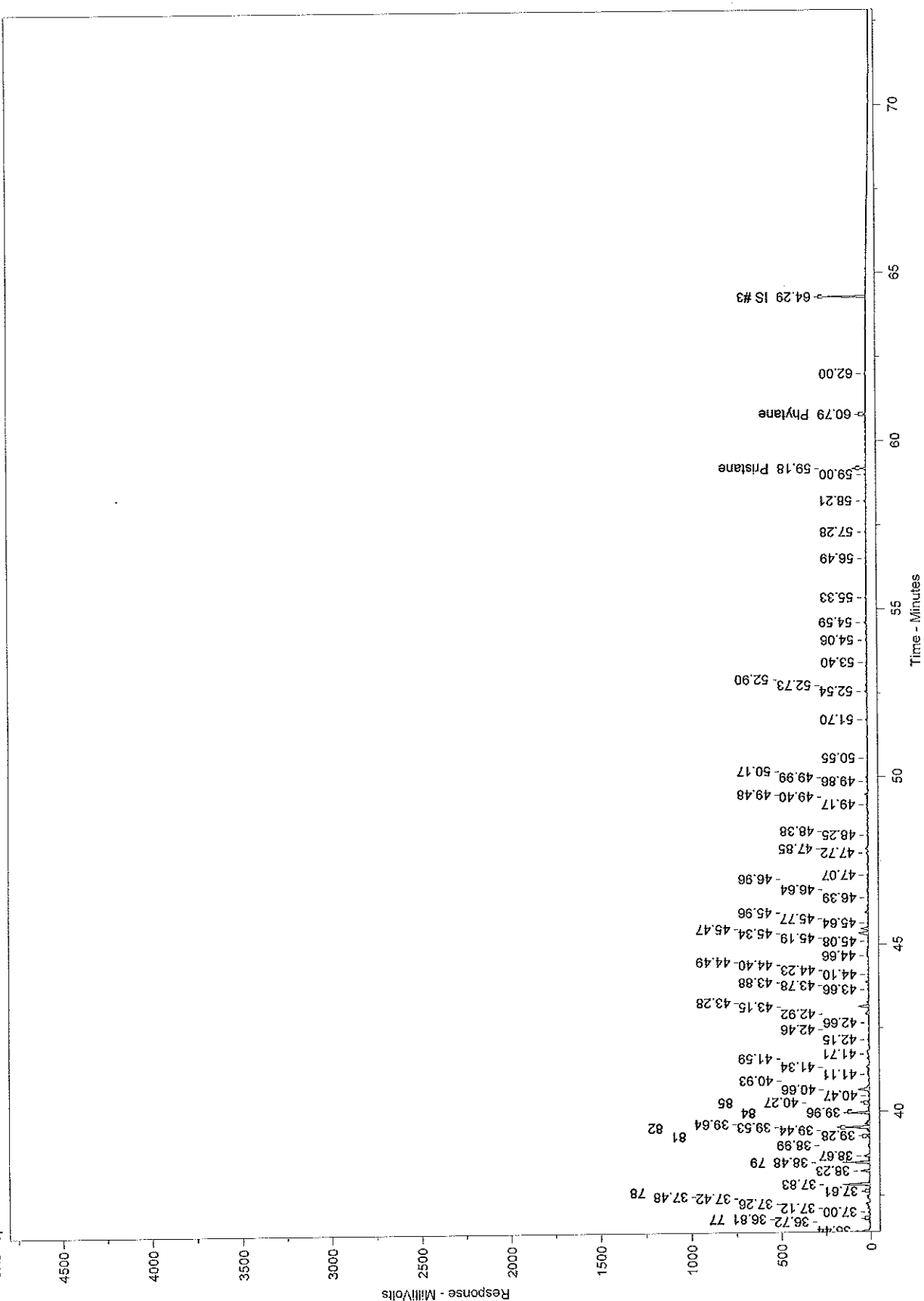
C:\CPS\pint\2015\Dec15\120915\120915.0014.RAW



Chrom Perfect Chromatogram Report

17515-1 [MW-409] [400+600CS2] + IS F-022715-1

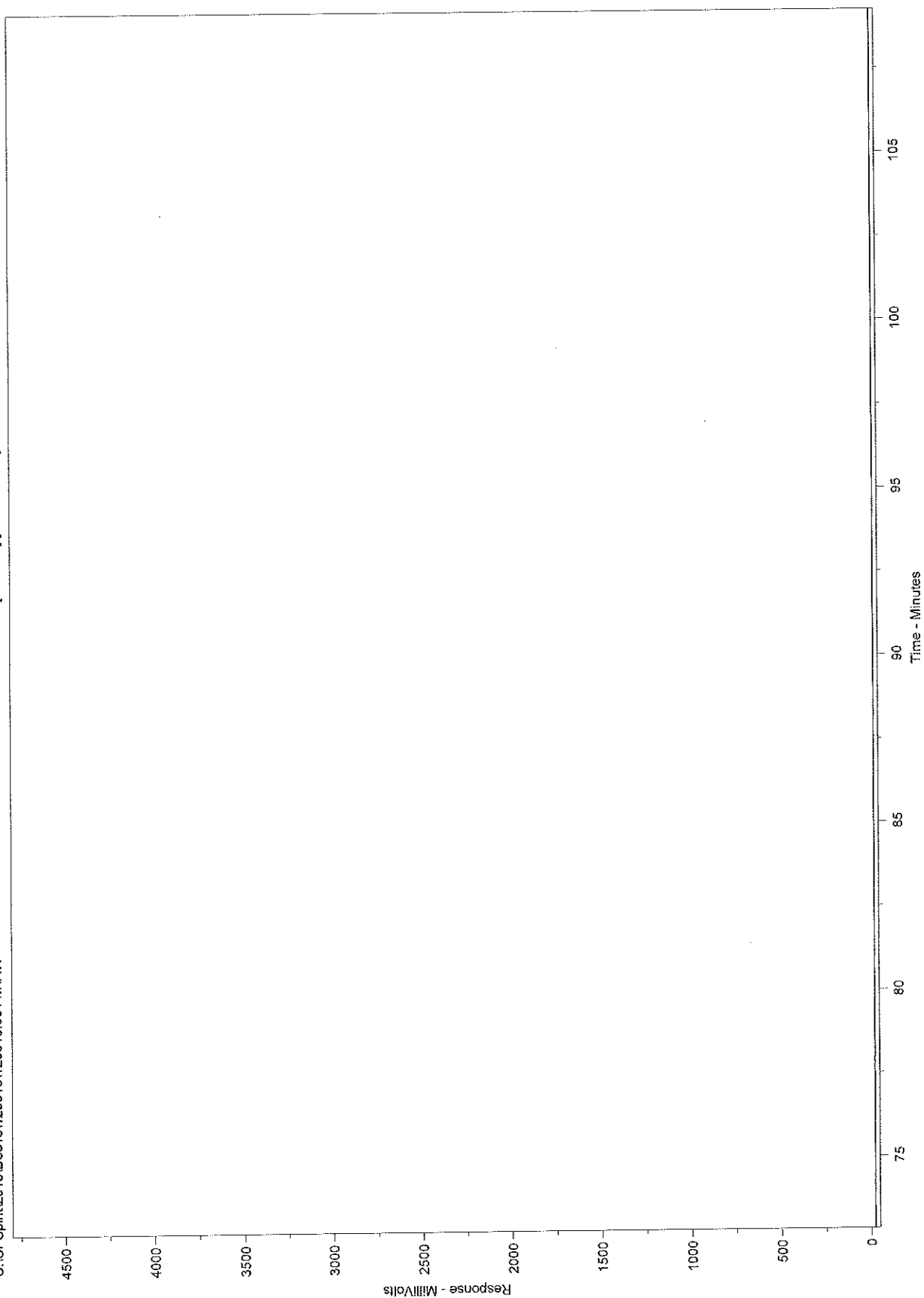
--- C:\CPS\Print\2015\Dec\15\120915\120915.0014.RAW



Chrom Perfect Chromatogram Report

17515-1 [MW-409] [400+600CS2] + IS F-022715-1

C:\CPSPrint\2015\Dec15\120915\120915.0014.RAW



Chrom Perfect Chromatogram Report

Sample Name = 17515-1 [MW-409] [400+600CS2] + IS F-022715-1

Instrument = Instrument 1

Acquisition Port = DP#

Heading 1 =

Heading 2 =

Raw File Name = C:\CPSpirit\2015\Dec15\120915\120915.0014.RAW

Date Taken (end) = 12/10/2015 5:55:19 PM

Method File Name = C:\CPSpirit\C344.met

Method Version = 44

Calibration File Name = C:\CPSpirit\111915.cal

Calibration Version = 3

Peak Name	Ret. Time	Area %	Area
4	5.94	0.1158	107939.90
8	6.80	2.0192	1881841.00
11	7.27	0.0514	47924.82
12	7.43	0.0113	10498.82
14	7.72	0.0288	26817.54
CS2	8.07	0.5695	530700.80
15	8.19	0.0091	8453.53
17	9.12	2.1214	1977074.00
18	9.27	0.6143	572481.40
19	9.84	0.3040	283272.90
20	10.63	0.0206	19201.69
26	12.02	0.0201	18702.03
27	12.27	6.9460	6473340.00
	12.54	0.0653	60851.87
30	13.95	0.0115	10710.71
31	14.56	0.3072	286257.80
32	14.72	14.3455	13369340.00
33	15.11	0.3343	311541.60
35	16.12	27.4233	25557140.00
IS #1	16.55	0.9638	898243.20
36	16.75	0.0201	18758.41
	17.45	0.0106	9892.34
37	18.09	0.0187	17393.67
38	19.02	2.3333	2174511.00
39	19.16	3.4583	3222974.00
40	20.29	8.9450	8336289.00
41A	20.57	5.5037	5129190.00
42	21.01	2.3205	2162581.00
	21.08	0.0875	81531.05
43	21.40	0.0765	71248.58
44	21.51	0.0262	24391.35
45	21.62	0.3981	371008.80
46B	21.92	0.0619	57724.46
47	22.71	2.8563	2661934.00
	23.15	0.0358	33340.26
49	23.75	0.0114	10578.56
	24.25	0.1008	93945.95
50	24.87	0.4560	424989.70
51	25.36	0.1042	97065.52
52	25.79	0.0911	84866.07
	26.14	0.0133	12430.62
53	26.23	0.2032	189367.40
	26.31	0.0356	33159.28
54	26.98	0.0444	41406.91
	27.09	0.0294	27424.01
55	27.58	0.1725	160774.30
	27.76	0.0409	38154.25
56	28.07	0.0109	10172.14
57	28.13	0.0116	10789.81
59	28.56	0.0128	11960.16
	28.84	0.2965	276345.20
60	28.97	0.0150	13962.29
61	29.10	0.9545	889546.30
	29.53	1.3251	1234939.00
62	30.31	0.9084	846601.10

Chrom Perfect Chromatogram Report

Peak Name	Ret. Time	Area %	Area
IS #2	30.46	0.7089	660618.80
63	31.10	0.1599	148975.30
64	31.41	0.5709	532055.70
	31.52	0.2014	187732.40
	31.94	0.1114	103790.60
65	32.27	0.2840	264670.50
	32.48	0.0436	40612.70
66	32.84	0.0365	34013.15
68	33.29	0.0192	17906.05
69	33.69	0.1194	111255.10
70	34.23	2.5382	2365445.00
	34.89	0.2122	197755.80
72	34.94	0.5266	490727.10
	35.08	0.1447	134833.70
73	35.16	0.1279	119195.30
	35.34	0.1959	182534.00
	35.40	0.1506	140335.00
	35.52	0.0485	45209.29
74	35.95	0.4165	388132.20
	36.08	0.1205	112277.30
75	36.15	0.2377	221489.50
76	36.27	0.0398	37096.51
	36.44	0.1551	144580.00
	36.72	0.0246	22879.56
77	36.81	0.0242	22514.67
	37.00	0.0344	32046.44
	37.12	0.0467	43553.19
	37.26	0.1188	110760.70
	37.42	0.0537	50070.50
	37.48	0.0555	51743.50
78	37.61	0.0186	17375.68
	37.83	0.4826	449753.30
	38.23	0.1639	152738.20
79	38.48	0.3359	313000.00
	38.67	0.1167	108742.70
	38.99	0.0501	46644.22
81	39.28	0.0596	55561.82
	39.44	0.0412	38354.12
82	39.53	0.4782	445633.00
	39.64	0.1241	115669.20
84	39.96	0.2941	274118.70
85	40.27	0.0403	37512.27
	40.47	0.0176	16372.32
	40.66	0.3342	311421.50
	40.93	0.0239	22238.26
	41.11	0.0414	38629.02
	41.34	0.0734	68395.52
	41.59	0.0322	29964.76
	41.71	0.0106	9880.42
	42.15	0.0300	27948.43
	42.46	0.0197	18372.79
	42.66	0.0175	16333.89
	42.92	0.1113	103726.70
	43.15	0.2132	198690.70
	43.28	0.0303	28253.20
	43.66	0.0166	15445.80
	43.78	0.0207	19307.22
	43.88	0.0586	54600.12
	44.10	0.0394	36685.79
	44.23	0.0217	20229.97
	44.40	0.0131	12162.41
	44.49	0.0118	11003.38
	44.66	0.0178	16634.75
	45.08	0.0157	14586.87
	45.19	0.0168	15628.21
	45.34	0.2321	216345.50
	45.47	0.1491	138953.00

Chrom Perfect Chromatogram Report

Peak Name	Ret. Time	Area %	Area
	45.64	0.0226	21099.37
	45.77	0.0139	12989.11
	45.96	0.0664	61893.34
	46.39	0.0135	12540.88
	46.64	0.0480	44701.17
	46.96	0.0159	14793.48
	47.07	0.0256	23861.94
	47.72	0.0313	29166.92
	47.85	0.0329	30658.22
	48.25	0.0190	17745.42
	48.38	0.0161	15048.40
	49.17	0.0163	15209.54
	49.40	0.0365	33990.67
	49.48	0.0450	41934.79
	49.86	0.0281	26155.54
	49.99	0.0345	32145.36
	50.17	0.0118	11028.05
	50.55	0.0234	21816.95
	51.70	0.0343	31949.80
	52.54	0.0362	33697.03
	52.73	0.0274	25519.22
	52.90	0.0234	21782.04
	53.40	0.0169	15716.89
	54.06	0.0210	19528.85
	54.59	0.0309	28835.92
	55.33	0.0167	15588.50
	56.49	0.0103	9622.88
	57.28	0.0200	18638.22
	58.21	0.0346	32262.09
	59.00	0.0169	15752.09
Pristane	59.18	0.0888	82738.68
Phytane	60.79	0.0370	34460.77
	62.00	0.0212	19734.95
IS #3	64.29	0.4906	457174.10

Total Area = 9.319512E+07

Total Height = 2.608581E+07

Total Amount = 1

12/9/2015

ZymaX ID	17515-2
Sample ID	MW-468

Evaporation

n-Pentane / n-Heptane	0.05
2-Methylpentane / 2-Methylheptane	0.16

Waterwashing

Benzene / Cyclohexane	0.00
Toluene / Methylcyclohexane	0.10
Aromatics / Total Paraffins (n+iso+cyc)	1.98
Aromatics / Naphthenes	7.26

Biodegradation

(C4 - C8 Para + Isopara) / C4 - C8 Olefins	187.87
3-Methylhexane / n-Heptane	2.14
Methylcyclohexane / n-Heptane	6.94
Isoparaffins + Naphthenes / Paraffins	7.93

Octane rating

2,2,4,-Trimethylpentane / Methylcyclohexane	0.16
---	------

Relative percentages - Bulk hydrocarbon composition as PIANO

% Paraffinic	3.72
% Isoparaffinic	20.46
% Aromatic	65.87
% Naphthenic	9.07
% Olefinic	0.88

12/9/2015

ZymaX ID
Sample ID

17515-2
MW-468

		Relative Area %
1	Propane	0.00
2	Isobutane	0.00
3	Isobutene	0.00
4	Butane/Methanol	0.00
5	trans-2-Butene	0.00
6	cis-2-Butene	0.00
7	3-Methyl-1-butene	0.00
8	Isopentane	0.02
9	1-Pentene	0.00
10	2-Methyl-1-butene	0.00
11	Pentane	0.02
12	trans-2-Pentene	0.00
13	cis-2-Pentene/t-Butanol	0.00
14	2-Methyl-2-butene	0.00
15	2,2-Dimethylbutane	0.00
16	Cyclopentane	0.00
17	2,3-Dimethylbutane/MTBE	0.05
18	2-Methylpentane	0.18
19	3-Methylpentane	0.23
20	Hexane	0.10
21	trans-2-Hexene	0.00
22	3-Methylcyclopentene	0.00
23	3-Methyl-2-pentene	0.00
24	cis-2-Hexene	0.00
25	3-Methyl-trans-2-pentene	0.06
26	Methylcyclopentane	0.32
27	2,4-Dimethylpentane	0.11
28	Benzene	0.00
29	5-Methyl-1-hexene	0.06
30	Cyclohexane	0.43
31	2-Methylhexane/TAME	0.43
32	2,3-Dimethylpentane	0.33
33	3-Methylhexane	0.73
34A	1-trans-3-Dimethylcyclopentane	0.27
34B	1-cis-3-Dimethylcyclopentane	0.41
35	2,2,4-Trimethylpentane	0.38
I.S. #1	à,à,à-Trifluorotoluene	0.00

12/9/2015

ZymaX ID
Sample ID

17515-2
MW-468

		Relative Area %
36	n-Heptane	0.34
37	Methylcyclohexane	2.38
38	2,5-Dimethylhexane	0.26
39	2,4-Dimethylhexane	0.40
40	2,3,4-Trimethylpentane	0.30
41	Toluene/2,3,3-Trimethylpentane	0.25
42	2,3-Dimethylhexane	0.59
43	2-Methylheptane	1.15
44	4-Methylheptane	0.45
45	3,4-Dimethylhexane	0.20
46A	3-Ethyl-3-methylpentane	1.98
46B	1,4-Dimethylcyclohexane	0.92
47	3-Methylheptane	0.10
48	2,2,5-Trimethylhexane	0.21
49	n-Octane	0.78
50	2,2-Dimethylheptane	0.09
51	2,4-Dimethylheptane	0.50
52	Ethylcyclohexane	4.36
53	2,6-Dimethylheptane	1.10
54	Ethylbenzene	1.03
55	m+p Xylenes	1.69
56	4-Methyloctane	1.57
57	2-Methyloctane	0.85
58	3-Ethylheptane	0.62
59	3-Methyloctane	2.82
60	o-Xylene	0.00
61	1-Nonene	0.76
62	n-Nonane	0.67
I.S.#2	p-Bromofluorobenzene	0.00
63	Isopropylbenzene	0.58
64	3,3,5-Trimethylheptane	1.48
65	2,4,5-Trimethylheptane	0.99
66	n-Propylbenzene	2.69
67	1-Methyl-3-ethylbenzene	0.51
68	1-Methyl-4-ethylbenzene	1.29
69	1,3,5-Trimethylbenzene	5.14
70	3,3,4-Trimethylheptane	1.90

12/9/2015

ZymaX ID
Sample ID

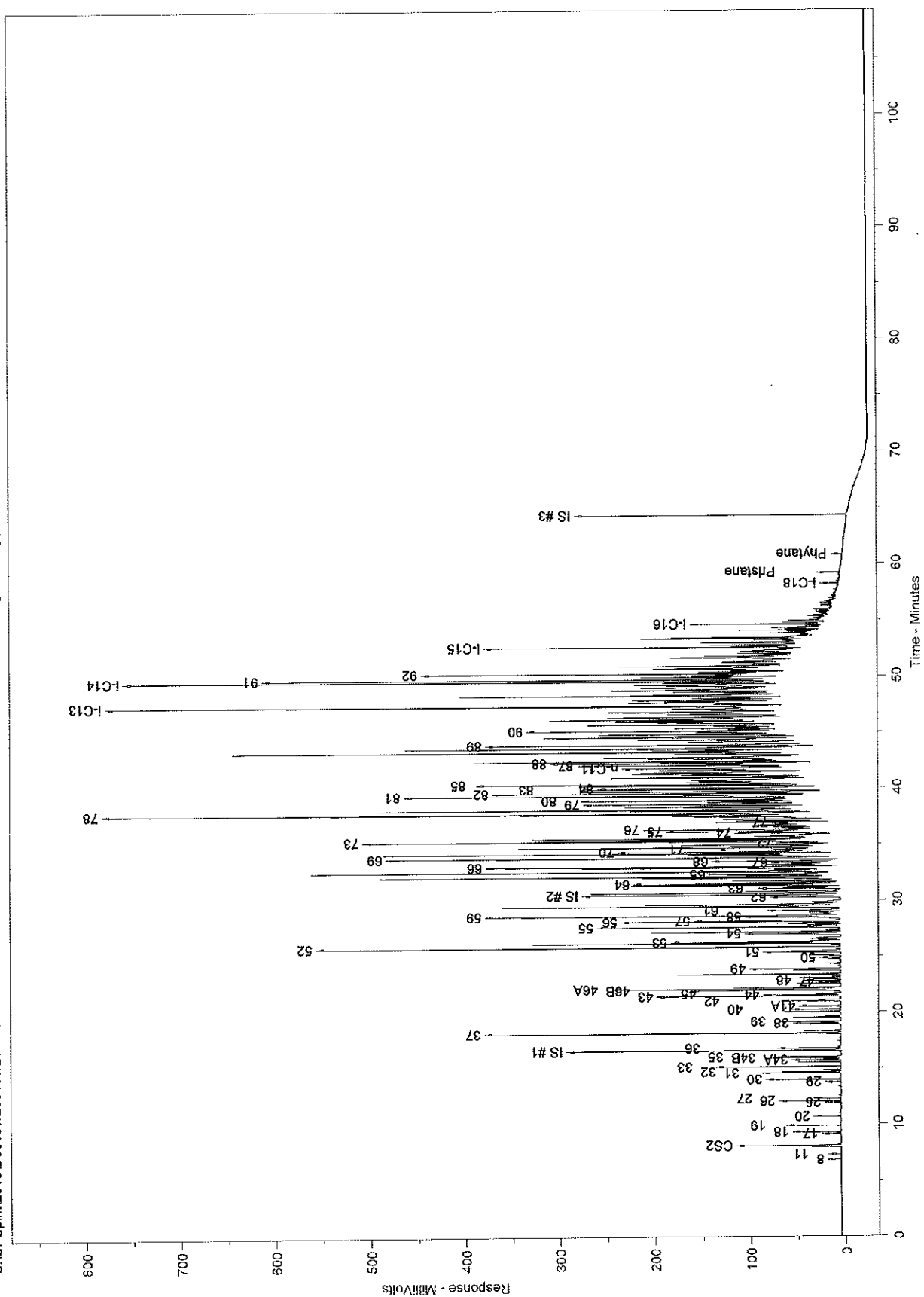
17515-2
MW-468

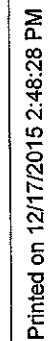
		Relative Area %
71	1-Methyl-2-ethylbenzene	1.26
72	3-Methylnonane	0.41
73	1,2,4-Trimethylbenzene	3.37
74	Isobutylbenzene	0.79
75	sec-Butylbenzene	1.86
76	n-Decane	1.81
77	1,2,3-Trimethylbenzene	0.46
78	Indan	7.00
79	1,3-Diethylbenzene	2.53
80	1,4-Diethylbenzene	1.79
81	n-Butylbenzene	4.43
82	1,3-Dimethyl-5-ethylbenzene	2.81
83	1,4-Dimethyl-2-ethylbenzene	2.70
84	1,3-Dimethyl-4-ethylbenzene	2.78
85	1,2-Dimethyl-4-ethylbenzene	2.78
86	Undecene	0.00
87	1,2,4,5-Tetramethylbenzene	2.04
88	1,2,3,5-Tetramethylbenzene	2.40
89	1,2,3,4-Tetramethylbenzene	3.47
90	Naphthalene	2.54
91	2-Methyl-naphthalene	4.41
92	1-Methyl-naphthalene	3.28

Chrom Perfect Chromatogram Report

17515-2 [MW-468] [400+600CS2] + IS F-022715-1

— C:\CPSPint\2015\Dec15\120915\120915.0015.RAW

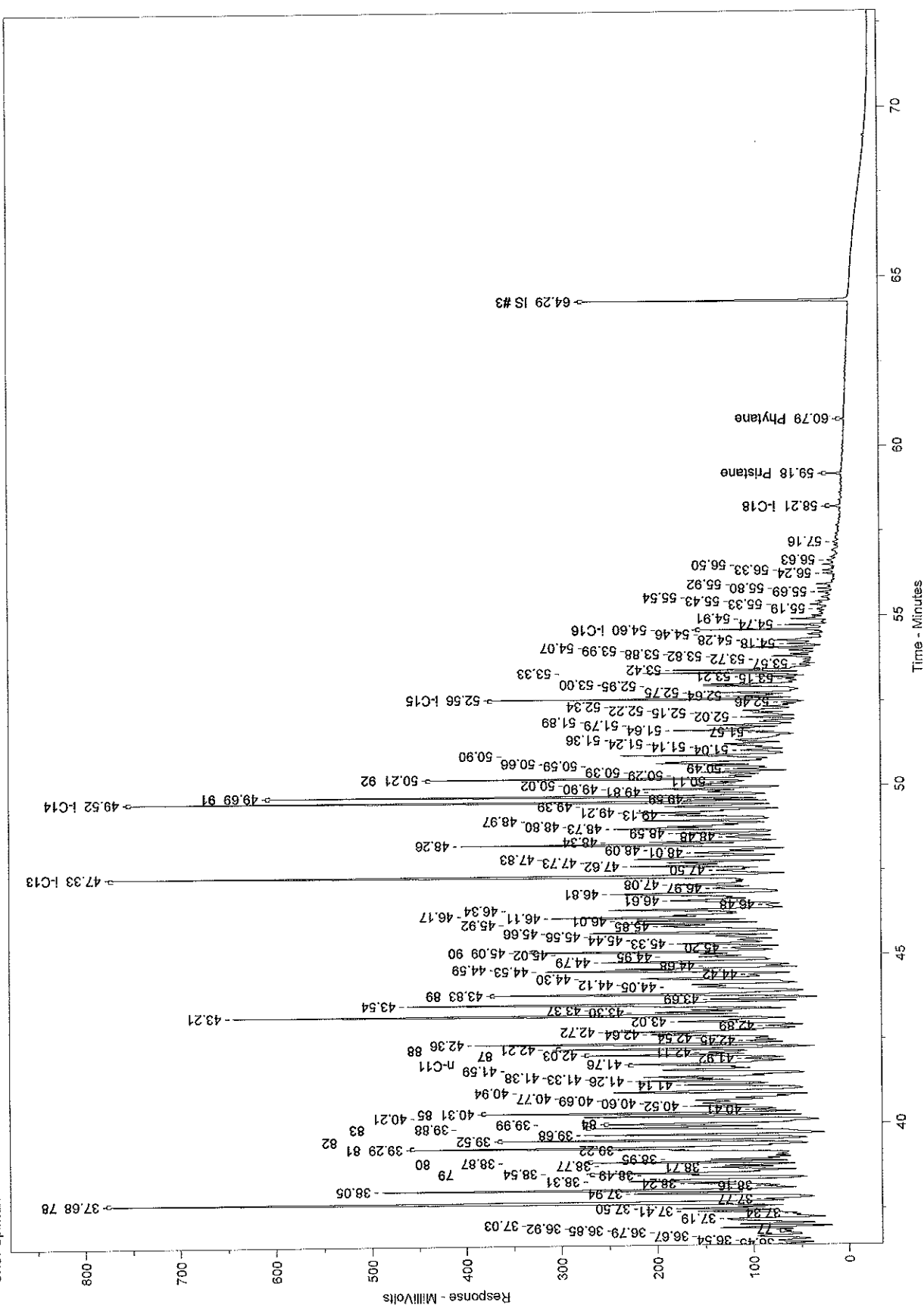




Chrom Perfect Chromatogram Report

17515-2 [MW-488] [400+800CS2] + IS F-022715-1

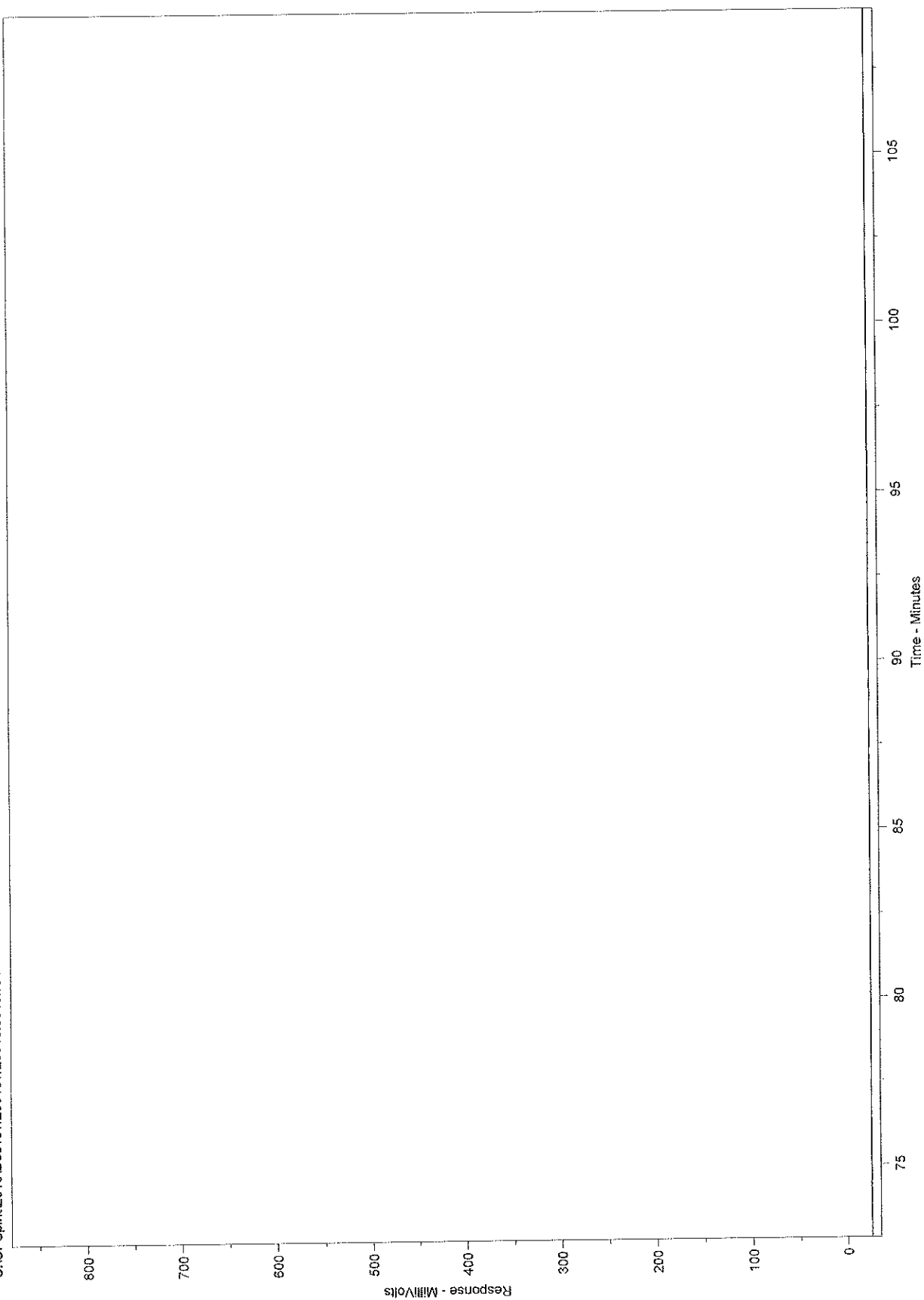
C:\CPSprint\2015\Dec15\120915\120915.0015.RAW



Chrom Perfect Chromatogram Report

17515-2 [MW-488] [400+600CS2] + IS F-022715-1

C:\CPS\pfr\2015\Dec15\120915\120915.0015.RAW



Chrom Perfect Chromatogram Report

Sample Name = 17515-2 [MW-468] [400+600CS2] + IS F-022715-1

Instrument = Instrument 1

Acquisition Port = DP#

Heading 1 =

Heading 2 =

Raw File Name = C:\CPSpirit\2015\Dec15\120915\120915.0015.RAW

Date Taken (end) = 12/10/2015 8:03:09 PM

Method File Name = C:\CPSpirit\C344.met

Method Version = 44

Calibration File Name = C:\CPSpirit\111915.cal

Calibration Version = 3

Peak Name	Ret. Time	Area %	Area
8	6.81	0.0049	8149.69
11	7.27	0.0046	7609.00
CS2	8.07	0.3016	500028.50
17	9.12	0.0127	21078.93
18	9.27	0.0472	78168.96
19	9.85	0.0590	97857.69
20	10.63	0.0265	43899.21
25	11.89	0.0141	23307.30
26	12.02	0.0804	133278.80
27	12.24	0.0292	48487.37
29	13.73	0.0154	25566.43
30	13.95	0.1091	180866.40
31	14.53	0.1110	184088.80
32	14.64	0.0846	140179.50
	14.81	0.0302	50124.78
33	15.10	0.1872	310305.20
	15.51	0.0705	116876.50
34A	15.69	0.0679	112612.20
	15.78	0.0300	49687.91
34B	15.87	0.1050	174085.00
35	15.98	0.0970	160763.50
IS #1	16.53	0.4305	713756.20
36	16.74	0.0873	144795.80
	17.40	0.0068	11340.37
37	18.09	0.6065	1005499.00
	18.30	0.0793	131525.80
	18.90	0.0506	83893.29
38	18.98	0.0675	111894.10
39	19.12	0.1018	168841.40
	19.51	0.0801	132872.00
	19.60	0.0277	45903.98
	20.01	0.0940	155761.40
40	20.21	0.0764	126608.80
41A	20.50	0.0627	103877.70
42	20.97	0.1507	249836.70
43	21.40	0.2937	486835.50
44	21.50	0.1154	191273.20
45	21.62	0.0500	82914.45
	21.81	0.0189	31346.08
46B	21.93	0.2338	387651.20
46A	22.04	0.5059	838660.40
	22.17	0.1712	283751.90
	22.55	0.0753	124860.10
47	22.67	0.0267	44196.14
48	22.79	0.0527	87386.89
	22.94	0.0468	77581.76
	23.02	0.1100	182397.00
	23.17	0.0174	28895.79
	23.37	0.2731	452805.10
	23.75	0.0814	135005.00
49	23.86	0.1992	330211.40
	24.35	0.0371	61576.13
	24.75	0.0246	40703.96
50	24.86	0.0240	39820.52
	25.02	0.0229	38019.81

Chrom Perfect Chromatogram Report

Peak Name	Ret. Time	Area %	Area
51	25.09	0.0560	92858.05
	25.37	0.1264	209475.80
	25.45	0.1201	199146.70
	25.61	0.0084	13968.00
52	25.80	1.1118	1843178.00
	25.99	0.0224	37176.36
	26.16	0.5527	916342.60
	26.24	0.2819	467277.60
53	26.31	0.1740	288423.30
	26.46	0.0390	64593.12
	26.54	0.0752	124592.20
	26.64	0.0412	68351.15
54	27.00	0.2641	437917.30
	27.15	0.3361	557130.90
	27.30	0.0314	52006.21
	27.39	0.0208	34503.95
55	27.59	0.4303	713452.30
	27.71	0.0473	78343.03
	27.76	0.0571	94614.59
	27.93	0.2107	349276.00
56	28.08	0.4017	665915.50
57	28.15	0.2162	358436.10
	28.43	0.0652	108127.90
58	28.49	0.1580	262006.60
59	28.59	0.7191	1192103.00
	28.72	0.0562	93244.99
61	28.92	0.1013	167940.90
	29.06	0.1942	321890.50
	29.21	0.0187	30968.10
	29.36	0.2856	473548.00
	29.45	0.6434	1066616.00
	29.59	0.4643	769698.30
	29.73	0.0320	52970.43
	29.82	0.0715	118514.70
62	30.26	0.1701	281938.00
IS #2	30.46	0.5923	982006.60
	30.64	0.5532	917107.20
	30.81	0.1892	313739.80
	31.05	0.1485	246137.80
63	31.19	0.1053	174501.30
	31.31	0.4126	684035.40
64	31.42	0.3787	627889.10
	31.53	0.3135	519718.70
	31.70	0.2414	400210.20
	31.88	0.0979	162312.90
	31.96	0.3692	612038.00
	32.08	0.9054	1500991.00
65	32.20	0.3162	524188.30
	32.28	0.2514	416731.70
	32.38	0.0877	145381.00
	32.52	1.0156	1683675.00
	32.60	0.2956	490011.10
	32.68	0.1170	193921.10
	32.75	0.1355	224578.80
	32.86	0.6343	1051641.00
66	32.96	0.6854	1136259.00
	33.09	0.0698	115640.20
	33.16	0.1423	235836.40
	33.23	0.0888	147294.70
67	33.31	0.1294	214548.00
68	33.45	0.3294	546032.90
69	33.75	1.3128	2176495.00
	33.90	0.1063	176244.80
	33.96	0.1730	286798.70
	34.03	0.3721	616964.50
	34.14	0.8385	1390189.00
	34.29	0.4857	805194.10
70			

Chrom Perfect Chromatogram Report

Peak Name	Ret. Time	Area %	Area
71	34.48	0.3212	532517.60
	34.68	1.0283	1704828.00
	34.91	0.3330	552134.60
72	35.10	0.1042	172720.30
73	35.24	0.8601	1425981.00
	35.32	0.5022	832578.40
	35.40	0.3276	543196.20
	35.49	0.5415	897694.50
	35.67	0.1268	210211.20
	35.73	0.0606	100459.00
	35.79	0.0290	48152.57
	35.98	0.2018	334474.00
74	36.09	0.4738	785426.90
75	36.27	0.4621	766021.70
76	36.45	0.1007	166986.70
	36.54	0.1593	264178.20
	36.67	0.2756	456976.80
77	36.79	0.1280	212252.70
	36.85	0.1173	194450.40
	36.92	0.2101	348267.30
	37.03	0.1732	287059.20
	37.19	0.4420	732825.90
	37.34	0.1426	236341.50
	37.41	0.2973	492960.60
	37.50	0.4884	809640.10
	37.68	1.7850	2959266.00
	37.77	0.1857	307870.50
78	37.94	0.5371	890469.70
	38.05	1.0085	1671994.00
	38.16	0.1610	266849.10
79	38.24	0.3092	512538.00
	38.31	0.6922	1147541.00
	38.49	0.3103	514485.90
	38.54	0.6451	1069489.00
	38.71	0.2837	470404.20
	38.77	0.2027	335996.70
	38.87	0.4579	759052.70
	38.95	0.5967	989245.20
	39.22	0.2970	492348.90
	39.29	1.1303	1873934.00
80	39.52	0.7159	1186863.00
81	39.68	0.5297	878131.70
	39.88	0.6892	1142667.00
82	39.99	0.7087	1174852.00
83	40.21	0.5155	854552.60
	40.31	0.7102	1177408.00
	40.41	0.1811	300233.50
84	40.52	0.4156	689070.20
	40.60	0.4150	688039.30
	40.69	0.3235	536366.90
	40.77	0.3226	534800.80
	40.94	0.7099	1176974.00
	41.14	0.4435	735290.30
	41.26	0.4859	805565.10
	41.33	0.2316	383914.00
	41.38	0.4007	664339.80
	41.59	0.5545	919323.00
n-C11	41.76	0.9272	1537140.00
	41.92	0.2452	406429.50
	42.03	0.5205	862860.30
85	42.11	0.3537	586427.40
86	42.21	0.6120	1014655.00
	42.36	0.7755	1285610.00
	42.45	0.1981	328428.70
	42.54	0.2057	340950.80
	42.64	0.5918	981169.10
	42.72	0.6543	1084791.00

Chrom Perfect Chromatogram Report

Peak Name	Ret. Time	Area %	Area
89	42.89	0.1669	276659.80
	43.02	0.6838	1133607.00
	43.21	1.2964	2149208.00
	43.30	0.4260	706230.20
	43.37	0.3053	506145.90
	43.54	1.5103	2503833.00
	43.69	0.2643	438191.20
	43.83	0.8850	1467274.00
	44.05	0.5028	833545.90
	44.12	0.3004	498004.80
	44.30	0.7099	1176968.00
	44.42	0.2677	443825.20
	44.53	0.6738	1117132.00
	44.59	0.3956	655780.90
	44.68	0.1563	259188.80
	44.79	0.6841	1134126.00
	44.95	0.3744	620733.60
	45.02	0.2837	470330.90
	45.09	0.6490	1075958.00
	45.20	0.3548	588208.40
90	45.33	0.4554	754947.30
	45.44	0.2833	469667.00
	45.56	0.4059	672999.50
	45.66	0.6236	1033800.00
	45.85	0.6587	1092019.00
	45.92	0.4643	769746.30
	46.01	0.4390	727736.80
	46.11	0.6869	1138778.00
	46.17	0.3980	659849.40
	46.34	0.6267	1038946.00
i-C13	46.48	0.2703	448178.00
	46.61	0.8197	1358923.00
	46.81	0.8002	1326694.00
	46.97	0.4739	785612.30
	47.08	0.8501	1409279.00
	47.33	1.7165	2845757.00
	47.50	0.5518	914852.90
	47.62	0.5337	884770.30
	47.73	0.3995	662315.80
	47.83	0.8142	1349776.00
i-C14	48.01	0.4404	730130.50
	48.09	0.2449	405998.50
	48.26	0.9784	1622066.00
	48.34	0.3772	625393.80
	48.48	0.4290	711292.90
	48.59	0.4780	792388.20
	48.73	0.5859	971324.30
	48.80	0.5437	901317.30
	48.97	0.4994	827888.90
	49.13	0.5356	887868.30
91	49.21	0.6656	1103499.00
	49.39	0.5288	876717.30
	49.52	1.2299	2038998.00
	49.59	0.2607	432285.80
92	49.69	1.1258	1866499.00
	49.81	0.4182	693254.70
	49.90	0.4273	708432.30
	50.02	0.4178	692601.30
	50.11	0.2130	353169.90
	50.21	0.8378	1389003.00
	50.29	0.2891	479242.30
	50.39	0.3306	548102.40
	50.49	0.2832	469437.70
	50.59	0.2554	423440.50
	50.66	0.7517	1246172.00
	50.90	0.5874	973876.10
	51.04	0.3109	515378.50

Chrom Perfect Chromatogram Report

Peak Name	Ret. Time	Area %	Area
i-C15	51.14	0.1638	271572.00
	51.24	0.3697	612981.30
	51.36	0.5856	970913.30
	51.57	0.1489	246818.20
	51.64	0.5015	831383.10
	51.79	0.2743	454807.30
	51.89	0.2493	413243.70
	52.02	0.2252	373363.70
	52.15	0.2135	353892.50
	52.22	0.3009	498894.50
	52.34	0.2127	352709.40
	52.46	0.0964	159844.80
	52.56	0.5198	861798.10
	52.64	0.2679	444076.90
	52.75	0.2910	482394.50
	52.95	0.2717	450399.00
	53.00	0.2196	364098.80
	53.15	0.1063	176157.20
	53.21	0.1255	208120.70
	53.33	0.3360	557072.30
	53.42	0.3351	555571.60
	53.57	0.0677	112185.50
	53.72	0.0444	73580.53
	53.82	0.1215	201484.70
	53.88	0.0827	137038.80
	53.99	0.0784	130012.60
	54.07	0.1409	233646.80
	54.18	0.0892	147878.50
	54.28	0.1475	244581.50
i-C16	54.46	0.0448	74337.41
	54.60	0.1817	301161.40
	54.74	0.0674	111722.50
	54.91	0.0528	87457.73
	55.19	0.0154	25592.54
	55.33	0.0377	62459.46
	55.43	0.0212	35207.25
	55.54	0.0154	25559.39
	55.69	0.0144	23853.55
	55.80	0.0225	37220.46
	55.92	0.0229	37961.09
	56.24	0.0167	27634.60
i-C18	56.33	0.0204	33743.92
	56.50	0.0234	38816.18
	56.63	0.0183	30362.18
	57.16	0.0116	19163.28
	58.21	0.0180	29776.30
	59.18	0.0208	34439.59
	60.79	0.0055	9078.12
	64.29	0.3401	563803.90
Pristane			
Phytane			
IS #3			

Total Area = 1.657861E+08

Total Height = 4.278653E+07

Total Amount = 0

REPORT OF ANALYTICAL RESULTS

Client: Jenny DeBoer
Stantec
1060 Andrew Drive; Suite 140
West Chester, PA 19380

Lab Number: 17515
Collected: 11/24/2015
Received: 12/2/2015
Matrix: Product

Project: Evergreen, Marcus Hook

Project Number: 213402493
Collected by: Jenny DeBoer

Sample Description: See Below

Analyzed: 12/17/2015
Method: ASTM D 1217

SPECIFIC GRAVITY

LAB NUMBER	SAMPLE DESCRIPTION	SPECIFIC GRAVITY
17515-1	MW-409	0.719
17515-2	MW-468	0.828